of the treatment. The resulting products are then summed across all defects and treatments. The expected cost of treatment peaks at age 5 at $12,713 per year. Costs remain elevated while children are of school age and begin declining at age 18. Beyond this point, costs are composed of treatment for the mentally retarded: lifetime institutionalization for the severely mentally retarded, and residential care and day services for the mild to moderately retarded.

With the values just described, it is possible to establish some order of magnitude of current costs of FAS in the United States. Again, because there is great uncertainty about the incidence of FAS, results are presented for 3 rates: 1 in 1,000, 1 in 600, and 1 in 200. The 1 in 200 value is much higher than has been suggested by anyone for the incidence of the full fetal alcohol syndrome. Recent findings indicate that an incidence of 1 in 1,000 is probably conservative at this point in time. A mid-range incidence rate for FAS is 1 in 600.

It is assumed in this analysis that the 3 incidence rates selected can be applied to all birth cohorts in the United States. Although this is a strong assumption, it is a useful hypothesis for this exploratory analysis. Future studies must establish the true prevalence of FAS in age cohorts.

Results of the analysis are presented in table B-3. The table reflects the total direct costs of treatment for services delivered whether from the health sector or other sectors, e.g., day services and special education. Assuming a 1 in 1,000 incidence rate, there were approximately 3,600 neonates with FAS in 1980, accounting for health treatment costs of $14.8 million. Across all cohorts, there were 68,000 FAS children aged 18 or under with total treatment costs of $670 million in 1980 ($75 million in health care costs and $590 million in educational services), and 160,000 FAS adults with treatment costs of $760 million ($416 million in health services and $344 million in nonmedical services). The 1 in 600 incidence rate implies that there were 380,000 FAS individuals in 1980 with direct services costs of $2.4 billion: 114,000 FAS children with health treatment costs of $125 million, and educational service costs of $990 million; and 267,000 FAS adults with health treatment costs of $574 million, and other service costs of $694 million. At a rate of 1 in 200, there were 340,000 FAS victims between the ages of 0 and 18, requiring $376 million in medical services and $3 billion in educational services. FAS adults numbered nearly 800,000

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Table B-3

Expected Cost of Health Treatment in 1980 Due to Fetal Alcohol Syndrome
Using Regimen Proposed in Table B-2
($ in millions)

Age	Persons (thousands)	Annual Expected Cost of Treatment (dollars)	Likely Treatments at Age	Total Cost at Prevalence Rate					
				Conservative 1/1,000		Mid-Range 1/600		High 1/200	
				Persons	Cost	Persons	Cost	Persons	Cost
0	3,598	$ 4,122	1,2,3A,3B,8,10	3,598	$ 14.8	6,009	$ 24.8	17,990	$ 74.2
1	3,212	578	3B,8,10	3,212	1.9	5,364	3.1	16,060	9.3
2	3,212	967	3B,3C,3D,8,10	3,212	3.2	5,364	5.2	16,060	15.5
3-4	6,425	7,328	3B,5A,8,10	6,425	47.1	10,730	78.6	32,125	235.4
5	3,453	12,713	3B,4,5A,6,7,8,10	3,453	43.9	5,767	73.3	17,265	219.5
6-7	6,906	11,876	3B,4,5A,6,7,8,10	6,906	82.0	11,533	137.0	34,530	410.1
8-9	6,906	11,701	3B,4,5A,6,7,8	6,906	80.8	11,533	135.0	34,530	404.0
10-14	17,846	11,663	3B,4,5A,6,8	17,846	208.1	29,803	347.6	89,230	1,040.7
15-18	16,483	11,260	4,5A,6	16,483	185.6	27,527	310.0	82,415	928.0
19-21	13,143	7,375	5A,6	13,143	96.9	21,949	161.9	65,715	484.7
22-64	120,765	4,522	5B,5C,6	120,765	546.1	201,678	912.0	603,825	2,730.5
65+	25,708	4,522	5B,5C,6	25,708	116.3	42,932	194.1	128,540	581.3
TOTAL	227,657	$404,638	-	227,657	$1,426.6	380,187	$2,382.4	1,138,285	$7,133.1

Source: Treatment regimen and costs proposed in table B-2; alternative prevalence rates suggested in discussions with Dr. Robert Sokol; computations by Research Triangle Institute; U.S. DOC, U.S. Bureau of the Census: Statistical Abstract of the United States, 1982-1983.

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with health care costs of $1.7 billion and nonmedical services of $2 billion. Costs are quite significant by these calculations.

The potential indirect costs from fetal alcohol syndrome are not quite as large as our estimates of the direct health treatment expenditures. The mental retardation associated with FAS means that these individuals are unlikely to achieve a level of productivity comparable to the general population. The 2.5 percent of FAS victims that are severely mentally retarded and, consequently, institutionalized, will certainly never be full participants in the work force. The 45 percent that experience mild to moderate mental retardation not requiring institutionalization will, nonetheless, be much more limited than others in their age cohorts. They are likely to be partially disabled and may, at best, be able to function in a sheltered work environment. The 52.5 percent of FAS victims characterized as having MBD are also expected to have reduced levels of productivity.

Each level of mental impairment has been assigned an expected level of productivity reduction. The severe to profoundly mentally retarded are expected to be completely disabled (i.e., with a 100 percent reduction in productivity). The moderately retarded are considered to be 50 percent impaired, and the mildly retarded are assigned an impairment of 25 percent. (These rates are based on government classifications of moderately retarded individuals as "trainable" and the mildly retarded as "educable;" North Carolina Division of Mental Health, personal communication.) A productivity reduction of 10 percent is assumed for those with minimal brain dysfunction.

The worst case scenario for productivity losses by FAS victims occurs when we apply the high incidence rate of 1 in 200 births to the population aged 18 to 64. This computation suggests that 671,000 adults would have impaired productivity in 1980. Using appropriate values for market and household productivity, and labor force participation, the indirect costs would be $2.6 billion. In comparison, this study has estimated other current productivity losses (excluding mortality) due to alcohol abuse at $55 billion, those due to drug abuse at $30 billion, and those due to other mental illnesses at just over $20 billion.

Applying the 1 in 1,000 incidence rate to the adult population provides an alternate estimate of the indirect costs of fetal alcohol syndrome. This rate suggests that there would be 133,000 FAS adults. Using the same impairment rates, the indirect productivity losses would be $510.5 million.

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The mid-range losses are estimated at $853 million, with 225,000 FAS victims of working age (18 to 64 years).

Of particular relevance in the estimation of lost productivity due to mental impairment is the proportion of mental retardation in the general population that is actually attributable to fetal alcohol syndrome. A 3 percent incidence rate is often cited as a reasonable estimate of the proportion of mentally retarded individuals in the adult population of the United States (N.C. Division of Mental Health, personal communication). However, some researchers have suggested that this figure represents an overestimate and that a 1 or 2 percent rate is more representative. On the basis of previously cited information that approximately 360,000 individuals or 20 percent of the mentally retarded are in residential care, a total estimate of 1.8 billion mentally retarded individuals in the United States can be calculated. U.S. Census Department figures estimate that there are 163 million adults over the age of 18 in the United States, allowing the calculation of a 1.1 percent incidence rate of mental retardation in the adult population (U.S. DOC, BOC, 1982). Using a mid-range estimate of 1 in 600, table B-4 illustrates that there are 107,000 mentally retarded adults (profound/severe, moderate or mild) whose mental impairment is directly attributable to fetal alcohol syndrome. This represents 5.6 percent of all mental retardation in the United States (utilizing the conservative estimate of 1.8 million mentally retarded adults). Alternatively, a 3 percent prevalence rate of mental retardation due to FAS can be calculated using the 3 percent (4.9 million adults) prevalence rate of mental retardation in the adult population.

At the present time, it does not seem possible to create better estimates of the indirect productivity losses due to fetal alcohol syndrome. It is believed that use of the high FAS incidence rate of 1 in 200 births establishes an absolute upper bound on these costs. Without information on the prevalence of FAS in adult cohorts and the degree of impairment actually experienced by these individuals, it is extremely difficult to determine how much lower these costs might be. The 1 in 600 FAS incidence rate is a current estimate. On the basis of the 1 in 600 rate, the fetal alcohol syndrome appears with Down's syndrome and spina bifida as a leading cause of birth defects.

The range of cost estimates presented above has been developed in order to illustrate the costs to society due to fetal alcohol syndrome.

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Table B-4

Lost Employment and Reduced Productivity in 1980:
Adult FAS Victims, Number of Persons, and Value of Lost Employment
(Number in thousands, $ in millions)

Mental Impairment	Total Lost Productivity at Prevalence Rate					
	Conservative 1/1000		Mid-Range 1/600		High 1/200	
	Persons	Value	Persons	Value	Persons	Value
Minimal brain disfunction	70	$130.3	118	$217.7	352	$ 651.5
Mild mental retardation	52	240.7	87	402.2	260	1,203.5
Moderate mental retardation	8	77.2	14	129.1	42	386.3
Severe/profound mental retardation	3	62.3	6	104.3	17	312.1
All FAS	133	510.5	225	853.3	671	2,553.4

Source: Research Triangle Institute.

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The model has been constructed in such a way that it can be readily modified to improve the precision of estimates when more and better information on the incidence of FAS in specific birth cohorts, the prevalence of particular birth cohorts within the fetal alcohol syndrome, the treatment regimen appropriate for these defects, and the cost of these treatments is available.

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C. RESEARCH DEVELOPMENTS ON THE RELATIONSHIPS AMONG MENTAL ILLNESS, DRUG ABUSE, AND CRIME

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SECTION C: RESEARCH DEVELOPMENTS ON CRIME AND MENTAL ILLNESS AND DRUG ABUSE

A. Introduction

This section offers some new research findings about crime and mental illness and drug abuse. The new contributions have led to improved estimates of the economic impact of these disorders on society. The findings were incorporated in the cost estimation of chapter III. This discussion is intended to offer further insights to the rationale behind the cost estimation.

B. Mental Illness and Crime

The approach to estimating costs of crime associated with mental illness is outlined in two sections below. In section one, the rationale and approach for estimating criminal justice system costs associated with mental illness and public order crime are presented. In section two, the reasons for not attributing costs associated with violent and property crime to mental illness are discussed.

1. Mental Illness and Public Order Offenses

Two recent developments have changed the way we deal with the mentally ill in U.S. society. Deinstitutionalization and stringent civil rights statutes limiting the involuntary commitment of those thought to be mentally ill have meant fewer individuals are hospitalized in mental health facilities (McGarry et al. 1981; Roth, 1980; Shah, 1981). One result of deinstitutionalization and limited civil commitment has been that more individuals who exhibit mental disorder symptoms are dealt with by the criminal justice system.

Eaton (1980) uses the term "bizarre behavior" to refer to human activities that are odd, incongruous, unexpected, or culturally deviant. Bizarre behavior, often taken to be an indication of mental illness, is also likely to attract the attention of the police or private citizens who are concerned, frightened, or disturbed by the behavior and notify the police. Those who act in a disruptive or troublesome manner have always been subject to detainment and arrest. Since deinstitutionalization and tightened requirements for involuntary commitment, more of the mentally ill are in the community and subject to arrest. Adler (1981) discusses this "hospital to jail" phenomenon.

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In a study of mentally ill offenders in Lucas County, Ohio, the authors argued that "Potential, past and current mental health patients are often converted to the status of criminal offenders on the basis of minor misconduct" (Ventura and Jacoby, 1983:1). Legislation in Ohio and other states was designed to minimize institutionalization and protect patients' rights had reduced mentally ill inpatient populations. Then, however, voluntary and involuntary commitments often could not be made because the number of treatment slots had been reduced and because the potential patient could not be shown to be a danger to himself or others. Ventura and Jacoby proposed that the police be allowed to hold the apparently mentally ill in the local jail to gain time to find a suitable alternative or until a crisis has passed.

There is considerable variation across the United States in legislation and policies toward institutional treatment and involuntary commitment of the mentally ill. The scenario described above for Lucas County, Ohio may not be exactly replicated in other jurisdictions. It seems clear, however, that, in the face of mental hospital deinstitutionalization and limits on involuntary civil commitment, the mentally ill have often come to the attention of the police in a situation requiring intervention by the criminal justice system.

The manner and conditions under which the deinstitutionalized mentally ill encounter the criminal justice system suggest how the costs might be estimated. The scenarios described above indicate that the mentally ill are most likely to be arrested for offenses of disorderly conduct, vagrancy, and the set of public order offenses recorded in the Uniform Crime Reports as "other offenses." Arrests for those categories totalled 2.575 million in 1980, or 24.7 percent of all arrests. Implications of the citations above are that an appreciable although relatively low proportion of arrests for public order offenses was due to the exhibited behavior of the deinstitutionalized mentally ill persons.

This study makes the conservative assumption that 10 percent of arrests for these public order offenses represents the number of mentally ill who are processed by the criminal justice system.

2. Mental Illness and Violent and Property Offenses

Collins and Schlenger (1983), Hare (1983), and James et al. (1980), using systematic diagnostic methodologies, found high rates of psychiatric disorder among prison inmates. The Collins and Schlenger

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findings, for example, showed that 77.5 percent of 1,149 male felons entering North Carolina prisons between March and May, 1983 had, in their lifetimes, received at least one psychiatric disorder diagnosis. This rate was twice as high as that for males in the Baltimore, New Haven, and St. Louis communities. In spite of this evidence that the prevalence of mental disorder is higher among criminal offenders than in the general population, no violent or property crime costs are assigned to mental illness.

There are two reasons for not assigning a crime causation factor to mental illness in spite of evidence that offenders are more likely to be diagnosed as having a psychiatric disorder than the general population. The first reason has to do with double counting. Substantial percentages of the psychiatric disorder diagnoses found among offenders are for alcohol abuse/dependence and drug abuse/dependence. Lifetime prevalence disorder rates for these categories were 49.5 percent and 18.8 percent in the North Carolina inmate sample. Alcohol abusers and drug abusers are not distinct from each other or all the mentally ill. Ascribing a criminogenic effect to mental illness would result in double counting because alcohol and drug abuse categories are confounded with other psychiatric disorder categories. Costs of crime associated with alcohol and drug abuse have already been estimated in conjunction with those problems.

The second reason for not ascribing crime costs to mental illness is the absence of any systematic explanation of how mental illness, other than that connected with alcohol or drug abuse, is responsible for involvement in criminal behavior. Schizophrenia, major depressive episodes, and obsessive compulsive disorders are not viewed as criminogenic. One disorder category that is associated with involvement in crime is antisocial personality. This disorder, however, is very often accompanied by an alcohol and/or drug abuse problem (American Psychiatric Association, 1980; Hare, 1983); therefore, the double counting of criminogenic effects is again an issue for this disorder type.

C. Drug Abuse and Violent Crime

In the 1981 report on the economic costs of ADM (Cruze et al., 1981), robbery was the only violent crime associated with drug abuse. Studies performed prior to 1981 indicating a causal connection between drug abuse and nonacquisitive violent crime were not convincing. It was and is clear that daily users of heroin engage in a great deal of property crime to help

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finance expensive drug habits, but it was not clear that drug abuse explained significant numbers of nonacquisitive violent crimes such as homicide and assault.

Recent evidence suggests that significant numbers of homicides and assaults are caused by drug abuse. The drug abuse-violence connection is seen to occur in two ways: (1) between participants in the illegal drug distribution system to control or expand market share or to retaliate for being "ripped off" in a drug transaction, and (2) as a pharmacologic effect of the abuse of certain single nonnarcotic drugs and polydrug use.

Violence in illegal drug distribution appears to be a serious problem in certain cities. Swersey (1981) examined the increase in homicides in Harlem from 1968 to 1973. He found that the increase was largely a function of an increase in deliberate killings--many of them drug-related. McGuire (1983) reports an analysis of the circumstances of 1,656 homicides that occurred in New York City in 1981. Interviews with investigating police officers resulted in 23.7 percent being classified as drug-related homicides. Zahn and Bencivengo (1974) found that, between 1969 and 1972 in Philadelphia, homicide between drug users increased appreciably and in 1972 represented 30.8 percent of all homicides occurring in the city. Wish et al. (1981) analyzed data on arrestees in Washington, DC and found that, contrary to beliefs that drug users tend not to be involved in assaultive crimes, drug positive arrestees were arrested for homicide and assault at about the same rate as nonusers. Monforte and Spitz (1975) found that 43 percent of 753 homicide victims in Detroit in 1973 were narcotics users and that the percentage of homicides connected with narcotics traffic is very high. Ongoing work by McBride (1983) using data for Miami, Florida shows that drug distribution system violence is a very serious problem.

It is clear from the evidence that drug distribution system violence varies across locations and across time periods. Riedel and Zahn (1983) studied homicide in eight American cities for 1978. They found considerable variation in the percentages of homicide victims found to have narcotics in their systems at medical examiner testing. The 1978 results for Philadelphia, one of the eight cities, showed the presence of narcotics in homicide victims was less than it had been in the earlier Zahn and Bencivengo (1974) study. Swersey's (1981) study of Harlem homicide also indicated a decrease in homicides from 1973 to 1974 after several years of

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increase. This over-time and over-location variation for drug distribution system violence makes the choice of a single causal estimate difficult.

There is evidence that the pharmacologic action of some drugs or drug combinations, in conjunction with other factors, is related to violent behavior. Although the evidence of an amphetamine relationship to violent behavior is not consistent, Ellinwood (1971) and Asnis and Smith (1978) found a direct relationship between amphetamine use and assaultive behavior. Tinklenberg (1973) found a clear association between barbiturate use and assaultive behavior. Chaiken and Chaiken (1981) also found a barbiturate use-assaultive crime relationship in a sample of prison inmates. Collins (1982) found that in a drug abuse treatment population, those whose primary drug problems were identified as amphetamines or barbiturates were significantly more likely to report assaultive behavior than were those with other types of drug problems.

The 1979 Survey of Inmates of State Correctional Facilities (U.S. DOJ, BJS, 1983c) found that 30 percent of persons incarcerated for violent offenses had been under the influence of some drug at the time of the crime.

The use of multiple psychoactive substances has become very common in recent years (Bray et al., 1982; Fishburne et al., 1980; Johnston et al., 1981). Drug abusers mix different drug types on the same drug use occasions and switch from one drug to another in serial fashion. This polydrug use pattern increases the potential for unpredictable behavior as a result of drug interaction effects. Very little information exists about the behavioral effects of polydrug use, so it is somewhat speculative to attribute violent behavior to the use of multiple drugs. However, in combination with the evidence already cited, the potential for drug interaction effects that produce violent behavior is an additional reason for changing the position in the 1981 report that attributed no drug abuse-violent crime effect.

It is the position of the present report that 10 percent of homicides and serious assaults are caused by drug abuse. The relationship is ascribed to drug distribution system violence and pharmacologic effects of barbiturate, amphetamine, and polydrug use with drug distribution system violence deemed most important. This 10 percent attribution is considered a conservative assumption made in the absence of appropriate data. The studies cited above offer strong evidence about the involvement of drug abuse in violence; however, the extent of the relationship is not well determined.

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D. ADMINISTRATIVE COSTS OF PUBLIC SOCIAL WELFARE PROGRAMS

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SECTION D: ADMINISTRATIVE COSTS OF PUBLIC SOCIAL WELFARE PROGRAMS

Just as various levels of government assist ADM victims in paying for their health care treatment, public social welfare programs are available to supplement the income of ADM victims that are disabled for some period of time. The major programs that provide assistance are listed in table D-1 and include unemployment insurance, disability payments, veterans pensions and compensation, workers compensation, and supplemental security income, among others. These programs accounted for cumulative expenditures of $65 billion in 1980. This is slightly more than half the contribution of governments to payments for personal health care expenditures.

The purpose of these social welfare programs is to assist individuals who suffer from both long- and short-term problems and have low earnings and/or income. In determining whether needy individuals are eligible for particular programs, information is filed on the nature of problems experienced by individuals. This information makes it possible to identify program expenditures that are due to ADM problems of beneficiaries.

Within these social welfare programs, a distinction must be made between two functions. First of all, the programs transfer income to needy individuals to make up for earnings or income that the individuals cannot provide for themselves. This component of program expenditures constitutes a transfer of income from the government (and taxpayers) to program-eligible individuals. This issue is discussed further in section E of this appendix. Secondly, there are real costs (administrative expenses) in effecting the transfer of income.

Total ADM-related administrative costs for these programs was $241 million in 1980 (Social Security Office, personal communication) (table D-1). Of this value, $201 million was associated with mental illness, $2 million with drug abuse, and $38 million with alcohol abuse. This constitutes approximately 6.6 percent of the total cost to administer public social welfare programs to all recipients. Excluding unemployment insurance and workers compensation, total administrative costs were $1.4 billion. Mental illness accounted for almost 15 percent of all affected program administration costs. Alcohol abuse represented about 2.5 percent of these costs. The impact of drug abuse was negligible.

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Table D-1
Public Program Social Welfare Administrative Expenditures and Costs Due to ADM Problems, 1980
($ in millions)

Program	Total Expenditures[a]	Percent Administrative Costs	Total Administrative Costs[a]	Costs Alcohol Abuse		Costs Drug Abuse		Costs Mental Illness	
				Percent	Amount	Percent	Amount	Percent	Amount
OASDHI-disability payments	$15,437	2.4	$ 370	3.4	$12	c	$b	8.9	$ 33
Unemployment insurance	16,503	11.0	1,815	-	-	-	-	-	-
Railroad temporary disability insurance	64	7.8	5	3.4	b	c	b	8.9	b
State temporary disability insurance[d]	1,330	3.2[f]	43	3.4	1	c	b	8.9	4
Workers compensation[d]	9,588	4.4[f]	422	-	-	-	-	-	-
Public assistance[e]	1,219	15.3	186	4.8	9	0.5	1	4.7	9
Supplemental Security Income	7,446	8.8	655	0.8	5	c	b	18.8	123
Food stamps	644	4.4	28	4.8	1	0.5	b	4.7	1
Veteran's pensions and compensation	11,306	0.8	90	9.7	9	0.9	1	23.6	21
Vocational rehabilitation[d]	976	4.7[f]	46	-	-	-	-	19.3	9
Total	$64,513		$3,661		$38		$2		$201

[a]Source: Social Security Administration, Office of Retirement and Survivors Insurance, personal communication.

[b]Less than $.5 million.

[c]Less than .0005.

[d]Excludes hospital and medical benefits.

[e]Excludes vendor medical payments and social services.

[f]Percent does not exclude hospital and medical program administrative costs.

(-) No causal relationship is assumed, or no beneficiaries reported ADM as primary cause of eligibility.

Totals may not add due to rounding.

Source: Research Triangle Institute.

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E. OTHER IMPACTS OF ADM ON THE ECONOMY

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SECTION E. OTHER IMPACTS OF ADM ON THE ECONOMY

A. Introduction

Consumers spend billions of dollars on alcoholic beverages and illicit drugs; a substantial proportion of property crime is committed by drug addicts; and ADM victims receive benefits from social welfare programs such as health treatment through Medicare. These expenditures might be considered to have impacts on the economy though they are intrinsically different from the costs measured in this report because they are indirect or are transferred resources rather than lost resources. The discussion in the following sections is presented to allow the public and policymakers to more completely assess the role of ADM in the economy although the costs discussed are not included in the framework established in this report to calculate the social cost of ADM.

B. Expenditures on Alcoholic Beverages and Illicit Drugs

Total legal alcoholic beverage production and sales in 1979 were $45.0 billion (U.S. DOC, Bureau of the Census, 1982); approximately 50 percent of the consumption was beer, 39 percent was distilled spirits, and 11 percent was wine (DeLuca, 1981). Illegitimate production of alcohol is believed to be negligible, but illicit consumption of alcohol merits attention. It is illegal for those underage to consume alcoholic beverages, and it is illegal to sell them alcoholic beverages. Among high school students in 1978, 31.2 percent were misusers of alcohol, 51.7 percent drank but did not misuse, and 17.2 percent abstained. Male misusers reported consumption of 3.56 gallons of ethanol annually (1.25 ounces of ethanol, or approximately 2.5 "drinks" per day); female misusers reported consumption of 2.59 gallons annually. Male and female drinkers who did not misuse consumed .74 and .48 gallons annually, respectively (Rachal, Maisto, Guess, and Hubbard, 1982). The U.S. Department of Commerce (1982) reports 13 million 15- to 17-year olds in 1978. These figures indicate total annual consumption of 16.5 million gallons (about 2 billion ounces) of ethanol.

Total U.S. sales in 1978 was 2.73 gallons of ethanol for each of the 174 million persons aged 14 or over. When comparing the self-reported consumption of 10th to 12th grade students (excluding 18-year olds) with reported sales of ethanol in the U.S. (DeLuca, 1981), it appears that youth aged 14 to 17 years consumed 3.5 percent of all ethanol in the United States in 1978.

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The value of purchases by underage youth is likely to be a smaller proportion of total expenditures than their share of volume of consumption. The contexts for drinking most often mentioned by youth were teenage parties, "hangouts," at home on special occasions, school activities, and in cars at night - all with peers only except at home. These contexts would involve lower prices than locations more typical of adult consumption such as restaurants and cocktail lounges. Furthermore, youth consume a larger proportion of beer, which is a relatively inexpensive source of ethanol.

Surveys of adult populations (age 18 and above) indicate very different drinking patterns than those of teenagers. Between 1971 and 1976 the average reported consumption (using quantity and frequency measures similar to those used to study youth) of all adults ranged from .40 to .50 ounces of alcohol per day (Noble, 1978). At 128 ounces per gallon, this represents approximately 1.3 gallons per year. The reported consumption accounted for only half of what is manufactured and sold. The same results are found for the reported consumption of adults and youth (age 15 to 17).

Lower reports of consumption than sales have been replicated in all of the national surveys, with the under-report ranging from 40 to 60 percent. Because youth aged 15 to 17 reported consuming 3.5 percent of all alcohol sold, this value was adjusted to nearly 7 percent of all alcohol sold.

Estimates of illicit drug use have been made by two government agencies: an interagency task force entitled the National Narcotics Intelligence Consumers Committee (NNICC); and the Internal Revenue Service. Both estimates used similar estimation methodologies and the same data sources.

NNICC estimated that the retail value of illicit drug consumption in 1979 ranged from $56 to $74 billion (see table E-1). Consumer expenditures for cocaine were $21.7 billion; for marijuana, $18.7 billion; for heroin, $8.5 billion; for other drugs, $16 billion. Volume of consumption was also estimated. The NNICC values represented the value of drugs consumed at "street" prices by retail customers and at "wholesale" prices by the dealers themselves.

The Internal Revenue Service estimated the value of marijuana, cocaine, and heroin only. These values were $8.6 billion, $5.7 billion, and $7.2 billion, respectively (see table E-1). Again, this represents the value of drugs consumed at "street" prices and value of drugs consumed by dealers. These values are somewhat lower than the corresponding NNICC estimates for

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Table E-1

Consumption of Illicit Drugs in 1979 as Estimated by NNICC and the IRS

Type of Drug	NNICC		IRS	
	Quantity (metric tons)	Retail Value ($ in millions)	Quantity (metric tons)	Retail Value ($ in millions)
Heroin	3.4-4.0	$7,790-9,160	1.9-4.5	$1,160-13,260
Cocaine	25-31	19,500-24,180	5.2-12.8	3,280-8,080
Marijuana	10,000-13,600	15,480-21,930	6,647	4,490-12,650
Hashish	200	1,480	N.E.	N.E.
Dangerous Drugs	-	12,000-17,000	N.E.	N.E.
Total		$56,250-73,750		$8,930-33,990

N.E.: Not Estimated.

Sources: NNICC (National Narcotics Intelligence Consumers Committee) and Internal Revenue Service, Department of the Treasury, 1983.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

marijuana (by 54 percent), cocaine (by 74 percent) and heroin (by 15 percent). Differences between NNICC and the IRS are due primarily to differences in estimating the consumption of marijuana (the IRS is lower by 44 percent), cocaine (by 68 percent), and heroin (by 14 percent). The balance of the differences in total values is due to differences in the calculation of price.

While the differences between the illicit drug consumption estimates of the NNICC and IRS are appreciable, both estimates are enormous. Both indicate the order of magnitude of the true values and establish a framework for improved estimates in the future.

C. Property Crime Transfers Associated with Drug Addiction

Property crime is one of the leading problems attributable to drug abuse and is of concern to society, the criminal justice system, the drug abuse treatment system, and policy makers. This report has estimated that nearly 35 percent of the costs to society of drug abuse are crime related. The value of property stolen due to drug addiction is relevant to understanding the impact on the economy of drug abuse; but because this value is a transfer payment, it is not directly estimated in this report.

Criminal career costs have been included as a cost to society. This component reflects the value of time diverted from legitimate (market and household) activities and used to pursue income through criminal activities including property crime, drug trafficking, and victimless crimes such as gambling and prostitution. Estimates in chapter III indicate that nearly 1.1 million addicts participated in a criminal career with a corresponding loss to society of $8.7 billion of productive effort.

Evidence on property crime and drug abuse has been collected from several sources. The National Crime Survey included a household component that gathered information on personal victimization by violent and property crimes and established an overall estimate of the value of property stolen in 1980. The survey asked detailed questions on the type of victimization, the time and place of occurrence, the injury suffered, loss of valuables, damage to property, and whether the offense(s) was reported to the police. A series of reports has assessed the extent of personal victimization in the United States on the basis of these data.

The nationally representative survey provides comprehensive estimates of the number and value of crimes for the type of offenses often associated

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

with drug abusers and addicts. Data on robbery, personal larceny, burglary, household larceny, and motor vehicle theft are also available.

There were 32.8 million victimizations in 1980 (see table E-2). The most frequent type of crime was personal larceny, with 14 million occurrences, one per every 16 persons in the U.S. The average value of property and cash stolen was $116 with a total value of $1.6 billion. Burglary resulted in the largest total transfer of $3.2 billion from 6.5 million victimizations. The 1.3 million motor vehicle thefts in 1980 had the largest average loss at $938 per incident. The total value of theft from all types of personal offenses was $7.3 billion. These BJS estimates represent the most comprehensive data to date on the extent and value of personal crime.

The 1981 RTI study reviewed evidence on the drug abuse-property crime link and concluded that one of five property crimes was attributable to drug addiction. Studies of arrestees, prison populations, drug abusers, and treatment populations were reviewed. Attributions to drug abuse were made for 26.8 percent of robberies, 22.4 percent of burglaries and 18.6 percent of larcenies and motor vehicle thefts (see table E-2). Application of these rates to the nationwide value of personal property crime in 1980 yields an estimate of $1.5 billion attributable to drug addiction. This estimate is partial. It does not measure the dollars lost by crime victims to drug abusers, does not include offenses like forgery, fraud and other types of crime, and does not represent income from the illegal drug distribution system or from victimless crimes such as prostitution. These estimates are relatively consistent with other recent research findings on the economic behavior of heroin addicts.

Johnson and Goldstein (1984) estimated that daily heroin users spend $13,189 on the drug per year, with those using heroin three to five days a week spending $6,431 per year on the drug. With an estimate of $10,000 a year as the average annual cost of heroin for addicts, 500,000 addicts spend $5 billion a year for the drug.

Recent findings from the Treatment Outcome Prospective Study (TOPS) indicate that daily heroin users have $8,426 more in illegal income per year than nonusers or nondaily users of heroin (Collins, Hubbard, and Rachal, 1984). Based on an assumption that two-thirds of heroin users are daily users (500,000 X .667 = 333,500), this group has a total of $2.8 bil-

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-2

Value of Property Transferred by Personal Crime in 1980;
Total and Proportion Attributable to Drug Abuse

Type	Number of Crimes (thousand)	Average Value	Total Value ($ in millions)	Attributed to Drug Abuse	
				Percent	Value ($ in millions)
Robbery	1,138	$ 138	$ 157	26.8	$ 42
Personal Larceny	14,023	116	1,621	18.6	302
Burglary	6,522	490	3,193	22.4	715
Household Larceny	9,787	116	1,138	18.6	212
Motor Vehicle Theft	1,290	938	1,210	18.6	225
Total	32,760	N.A.	$7,319	N.A.	$1,496

Source: U.S. DOJ, BJS, unpublished data, and U.S. DOJ, BJS, NCJISS, 1983 and causal factors from Cruze et al., 1981.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

lion in illegal income. For many heroin addicts, this illegal income comes primarily from victimless crime and does not involve the direct victimization of others.

In comparison to extrapolations from Johnson and Goldstein (1984) and Collins et al. (1984), the $1.5 billion loss suffered by victims shown in table E-2 seems small. It should be remembered, however, that the $1.5 billion estimate is for a limited number of offenses and does not include illegal income earned from drug distribution, often a major income source for drug addicts.

D. Public Transfer Payments to ADM Victims

Another impact of ADM on the economy is the social welfare program transfer payments received by ADM victims. Victims are eligible to receive benefits under some social welfare programs. These values are not costs to society using the conceptual framework developed by the Public Health Service (Hodgson and Meiners, 1979). Clients usually qualify for transfer payments because of a consequence of ADM which is considered and totalled as a cost in this report. Adding the value of transfer payments to the cost estimates would result in "double counting" of the problem.

For example, OASDHI-disability payments are made to compensate persons who are unable to work for their loss in earnings. The "lost employment" estimates included in the PHS framework represents the value of productivity that is lost because persons cannot function in the workplace and at home. The value of these transfers can be estimated using information on administrative expenses in public social welfare programs (see section D of this appendix).

Social welfare program transfers excluding unemployment insurance and workers compensation totaled $37 billion in 1980. ADM disorders accounted for $7.5 billion, or 20 percent (table E-3). Mental illness represented $5.6 billion in transfers, just over 15 percent; alcohol represented 5 percent; the impact of drug abuse was negligible.

The administrative costs and the value of transfers from these programs were distributed among alcohol abuse, drug abuse, and mental illness based on varying factors. For programs involving disability payments, the distributional factors were equal to the proportion of patient days attributable to the disorder spent in general hospitals and VA hospitals. More specific data were available for programs related to vocational rehabilitation (U.S.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-3

Public Program Social Welfare Transfer Payment Expenditures and Costs Due to ADM Problems, 1980
($ in millions)

Program	Total Expenditures[a]	Percent Transfer Costs	Total Transfer Costs[a]	Costs Alcohol Abuse		Costs Drug Abuse		Costs Mental Illness	
				Percent	Amount	Percent	Amount	Percent	Amount
OASDHI-disability payments	$15,437	97.6	$15,067	3.4	$ 507	c	$ 2	8.9	$1,341
Unemployment insurance	16,503	89.0	14,688	-	-	-	-	-	-
Railroad temporary disability insurance	64	92.2	59	3.4	2	c	b	8.9	5
State temporary disability insurance[d]	1,330	96.8[f]	1,287	3.4	43	c	b	8.9	115
Workers compensation[d]	9,588	95.6[f]	9,167	-	-	-	-	-	-
Public assistance[e]	1,219	84.7	1,032	4.8	49	0.5	5	4.7	49
Supplemental security income	7,446	91.2	6,791	0.8	53	c	2	18.8	1,279
Food stamps	644	95.6	616	4.8	29	0.5	3	4.7	29
Veteran's pensions and compensation	11,306	99.2[f]	11,216	9.7	1,088	0.9	102	23.6	2,651
Vocational rehabilitation[d]	976	95.3	930	-	-	-	-	19.3	179
Total	$64,513		$60,851		$1,771		$115		$5,648

[a]Source: Social Security Administration, Office of Retirement and Survivors Insurance, personal communication.

[b]Less than $.5 million.

[c]Less than .0005.

[d]Excludes hospital and medical benefits.

[e]Excludes vendor medical payments and social services.

[f]Percent does not exclude hospital and medical program transfer costs.

(-) No causal relationship is assumed, or no beneficiaries reported ADM as primary cause of eligibility.

Totals may not add due to rounding.

Source: Research Triangle Institute.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

DOC, BOC, 1982) and social security income (U.S. DHHS, SSA, personal communication). These proportions are based on information collected on persons likely to receive assistance from these programs.

E. Sources of Payments for Health Care Expenditures

In the main body of the report, values were assigned to the health treatment services received by ADM victims, regardless of the source of payment. The data on source of payment describe how the cost burden is borne.

How much the government pays for the treatment of ADM victims is a relevant topic for policymaking. The size of the ADM treatment bill will be pertinent to the Federal government and private third-party insurers in deciding whether or not to provide coverage for these disorders.

This question has been addressed in the same fashion as in the 1981 study. The first step was to obtain financial data on health settings specializing in ADM treatment. The NDATUS survey obtains financial information from specialty units which treat alcohol and drug abusers.

The data for alcohol and drug abuse treatment specialty units are presented in table E-4. For units primarily providing alcohol abuse services, the largest single source of payments was private health insurance, at 26 percent of $1.1 billion in 1980. State, Federal, and local governments paid an additional 45 percent, with state government paying 21 percent. Client fees were the next largest source, at approximately 10 percent or $110 million.

Settings offering primarily drug abuse treatment are somewhat different (table E-4). Of funds totaling $534 million in 1980, 7 percent were client fees, 8 percent came from private health insurance, and the remaining 81 percent was from a variety of government sources.

Community mental health centers primarily serve individuals with other mental disorders, although some alcohol and drug abusers are clients. The National Institute of Mental Health has collected information on funding for CMHCs. Their findings are presented in table E-5. Government funds, including grants for various purposes, provided 64 percent of the CMHC resources. Twenty-one percent were Federally funded with 34 percent from the state, and 9 percent from other governmental units. Direct services provided by CMHCs generated 32 percent of revenues (3.7 from patient fees and 7.3 percent from private insurance). The remaining 21 percent was from sources such as Medicare, Medicaid, schools, and other grants.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-4

Funding for All Alcoholism and Drug Abuse Treatment Units
by Source of Funds in 1980
($ in thousands)

Funding Source	Alcohol Abuse		Drug Abuse	
	Amount	Percent	Amount	Percent
ADAMHA block grant	$ 50,910	4.5	$ 67,804	12.7
Other ADAMHA program support	12,133	1.1	11,572	2.2
Other Federal funds	112,456	10.0	46,070	8.6
State government	235,751	21.1	165,412	31.0
Local government	108,254	9.6	41,423	7.8
State/local government	45,413	4.0	16,612	3.1
Social services block grant	13,959	1.2	5,174	1.0
Public welfare	18,257	1.6	17,226	3.2
Public health insurance	77,922	6.9	62,229	11.7
Private health insurance	296,419	26.4	43,513	8.2
Private donations	28,754	2.6	17,358	3.3
Client fees	110,272	9.8	35,588	6.7
Other	12,677	1.1	3,651	0.7
Total	$1,123,175	100.0	$533,631	100.0

Totals may not add due to rounding.

Source: U.S. DHHS, NIAAA (1983); U.S. DHHS, NIDA (1983).

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-5

Source of Operating Funds
Federally Funded Community Health Centers
in 1980

Source of Funds	Percent
Government funds	64.2
Federal funds	21.2
Staffing grants	15.2
Construction grants	0.8
Children's grants	1.4
Research and training	0.4
Other Federal funds	3.5
State funds	33.9
Local government funds	8.8
Other government funds	0.2
Receipts from direct services	31.8
Patient fees	3.7
Insurance (priv. & voluntary)	7.3
Medicare	2.9
Medicaid	10.9
Schools	1.0
Title XX	3.7
Other receipts from services	2.2
Receipts from indirect services	0.6
Schools	0.2
Other receipts	0.4
Philanthropy	0.5
Other fund raising	0.8
Other receipts	2.2
Total	100.0

Totals may not add due to rounding.

Source: U.S. DHHS, NIMH (1981).

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

The types of health treatment settings discussed above represent a small proportion of all treatment services used by ADM victims. Data on the other settings, including general hospitals, physicians' offices, nursing homes, and other health providers and sundries, are maintained for all illnesses on an annual basis. This study has distributed the aggregate expenditures of alcohol abuse, drug abuse, and mental illness for each setting estimated above by the percentage distribution of national funding sources. The costs for alcohol abuse exclude fetal alcohol syndrome because costs were not estimated by setting for this disorder. Tables E-6 through E-8 report the expenditure for each setting and its distribution across out-of-pocket and various third party funds including Federal, state and local, and private. These funds are reported according to the distribution of illnesses being treated in that setting.

For alcohol abuse, of the $8 billion spent in settings for which we have data, the two largest payment sources are Federal funds and private third party funds, each contributing approximately 31 percent. This is followed by individuals, and State and local third party funds which together provide approximately 12.5 percent of all resources.

Drug abuse treatment expenditure patterns are similar. Twenty percent of all payments are from out-of-pocket sources and more than 20 percent from state and local governments. Federal funds and private third party funds each contribute slightly more than 30 percent of the total budget. For mental health treatment, the largest payment source was from Federal funds, with approximately 33 percent. Out-of-pocket sources and private third party funds covered approximately 25 percent each, while state and local governments paid under 20 percent of all costs.

It has also been possible to obtain more specific information on payments from Medicare for ADM disorders. These data overlap with values discussed immediately above and represent the proportion of federal payments for Medicare services in general hospitals.

Unpublished 1980 data on inpatient hospital discharges by Medicare eligible individuals indicate that ADM disorders accounted for 3.8 percent of all discharges (table E-9). Of 10.3 million total Medicare discharges, 129,000 or 1.3 percent were related to alcohol abuse as defined by diagnostic codes. Thirty-seven thousand discharges (0.4 percent) were associated with drug abuse, and 214,000 discharges (2.1 percent) were associated with other

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-6

Estimates of Funds for Alcohol Abuse by Setting and Source, 1980
($ in millions)

Setting	Expenditures for Alcohol Abuse Treatment	Out of Pocket	Third Party Funds		
			Federal	State & Local	Private
ADM specialty hospitals[a]	-	-	-	-	-
General hospitals	$4,800	$ 437	$1,982	$ 624	1,747
Other specialty facilities					
CMHCs	181	7	38	81	55
Alcohol abuse facilities	385	38	60	118	169
Other facilities[a]	-	-	-	-	-
Other general services					
Nursing homes	167	70	52	43	2
Physician services	726	271	147	45	264
Dentist services	621	271	13	10	130
Other health professionals	171	101	33	13	24
Drug and drug sundries	750	620	31	30	69
Other health services	359	-	185	80	94
Volunteer services	-	-	-	-	
Total	$8,160	$2,012	$2,541	$1,044	$2,554

Totals may not add due to rounding.

[a]Data not available. Expenditures in ADM specialty hospitals and other facilities were over $6 billion.

Source: U.S. DHHS, NIAAA (1983); U.S. DHHS, NIMH (1981); Gibson and Waldo (1981).

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-7

Estimates of Funds for Drug Abuse by Setting and Source, 1980
($ in millions)

Setting	Expenditures for Drug Abuse Treatment	Out of Pocket	Third Party Funds		
			Federal	State & Local	Private
ADM specialty hospitals[a]	-	-	-	-	-
General hospitals	$ 527	$248	$218	$ 69	192
Other specialty facilities					
CMHCs	50	2	11	22	15
Drug abuse facilities	295	20	69	114	92
Other facilities[a]	-	-	-	-	-
Other general services					
Physician services	28	10	6	2	11
Dentist services	59	45	1	1	12
Other health professionals	16	10	3	1	2
Drug and drug sundries	71	58	3	3	7
Other health services	34	-	17	8	9
Volunteer services	-	-	-	-	
Total	$1,080	$193	$328	$220	$338

Totals may not add due to rounding.

[a]Data not available. Expenditures in ADM specialty hospitals and other facilities were over $6 billion.

Source: U.S. DHHS, NIDA (1983); U.S. DHHS, NIMH (1981); Gibson and Waldo (1981).

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-8

Estimates of Funds for Mental Illness by Setting and Source, 1980
($ in millions)

Setting	Expenditures for Mental Illness Treatment	Out of Pocket	Third Party Funds		
			Federal	State & Local	Private
ADM specialty hospitals[a]	-	-	-	-	-
General hospitals	$5,088	$ 463	$2,101	$ 661	1,862
Other specialty facilities					
CMHCs	997	37	211	446	303
Other facilities[a]	-	-	-	-	-
Other general services					
Nursing homes	2,783	1,166	863	718	46
Physician services	870	315	176	54	326
Other health professionals	184	109	36	14	26
Drug and drug sundries	810	670	33	32	74
Other health services	388	-	199	87	102
Volunteer services	-	-	-	-	-
Total	$11,120	$2,760	$3,619	$2,012	$2,729

Totals may not add due to rounding.

[a]Data not available. Expenditures in ADM specialty hospitals and other facilities were over $6 billion.

Source: U.S. DHHS, NIMH (1981); Gibson and Waldo (1981).

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

mental disorders. Applying these proportions to the $26.3 billion distributed by Medicare to pay for inpatient hospital stays, $332 million were attributable to alcohol abuse, $95 million due to drug abuse, and $552 million due to mental illness.

These estimates suggest that Medicare payments for alcohol abuse accounted for $342 million out of the federal government total of $1,982 million (17 percent). For drug abuse, the Medicare value of $95 million was 44 percent of federal payments for hospital services. Medicare paid $989 million, or 47 percent of the federal share for mental illness of $2.1 billion.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table E-9

ADM Related Hospital Loss Reimbursed by Medicare, 1980
(Number in thousands, $ in millions)[a]

	Discharges		
	Number	Percent	Payments
Alcohol Abuse	129	1.3	$ 342
Drug Abuse	37	.4	105
Mental Illness	214	2.1	552
Total ADM	381	3.8	999
All Illnesses	10,334	100.0	$26,300

[a]Costs included are based on hospital discharges.

Source: U.S. DHHS, HCFA, personal communication.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

F. ALCOHOL ABUSE RELATED GASTROINTESTINAL TRACT CANCERS

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SECTION F: ALCOHOL ABUSE RELATED GASTROINTESTINAL TRACT CANCERS

A. Introduction

Controversy exists on whether alcohol abuse is causally related to cancers of the gastrointestinal tract. While there is strong evidence that malignancies of the liver can be caused by alcohol abuse, research findings on other neoplasms are mixed. Costs of liver malignancies are represented in the main body of the report. In lieu of more definitive findings about alcohol abuse and other cancers, these costs were not included. This section outlines the potential magnitude of costs of other cancers of the gastrointestinal tract.

B. Evidence on the Link

Several studies have been performed in the last 20 years which indicate that alcohol abuse is related to cancer of the gastrointestinal tract. These studies have found a significant increase in risk associated with high levels of alcohol abuse, leading to malignancies of the GI tract. In Alcohol and Health III (Noble, 1978), it was estimated that over 50 percent of primary malignant liver cancers were due to alcohol abuse. However, studies have indicated both higher and lower levels of association. A wide variation has been found in the association of other GI tract cancers to alcohol abuse.

A factor significantly aggravating the relationship of alcohol abuse to cancer is consumption of tobacco. Epidemiological studies indicate that consumption of alcohol and tobacco increases the risk of contracting cancer over that of consumption of only one or the other product.

After studying the smoking and drinking habits of 483 people with cancer of the mouth and pharynx and 447 controls, Rothman and Keller (1972) reported that risks accelerated with increased exposure to each factor. They calculated that 76 percent of the disease in males might be eliminated if exposure to both alcohol and tobacco were avoided. Another study reported that women who drink and smoke heavily may develop cancers of the buccal cavity and tongue 15 years earlier than women who abstain from both (JAMA, 1976).

The means by which alcohol acts on body tissues is still unclear. There are theories that specific ingredients in different types of alcohol are carcinogens. Similarly, the effect of tobacco on body tissues must be

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

better understood to disentangle the combined effects of both of these substances.

Malnutrition and anemia have also been associated with increased risk of oral, hypopharyngeal, and esophageal cancers. Nutritional defects, especially of vitamin-B complex and iron, have been associated with heavy alcohol intake (Wynder and Shigomatsu, 1967). Studies have reported that alcohol impairs the absorption of thiamine in the intestines, and that several intestinal enzymes that aid in the movement of nutritional factors into the blood streams are affected by alcohol (Mezey et al., 1970; Mott et al., 1972; Roggen et al., 1972).

In studies of alcohol related cancer risks, authors have emphasized the need to clearly distinguish among the specific forms, amounts, and duration of drinking involved. Increasing knowledge about how cancer is caused and how it is related to alcohol abuse has not yet produced a consensus on which cancers are caused by alcohol and what proportion of new cancers and of mortalities are related to alcohol abuse.

C. Potential Costs

Nonetheless, it is possible to examine the potential implications for the economic cost of alcohol abuse if alternative causal factors between alcohol and GI tract neoplasms are hypothesized.

A list of GI tract neoplasms that have been related to alcohol abuse is presented in table F-1. The number of mortalities by type of cancer, and the estimated total cost in 1980 for each type of cancer are also presented. These neoplasms caused more than 60,000 premature deaths in that year. Table F-2 presents estimates of the direct treatment costs in specific settings for 1980-1982 for the alcohol abuse-associated cancers of the GI tract. Another major cost which is associated with mortality is lost productivity.

The analyses indicate that if 100 percent of the specified cancers could be attributed to alcohol abuse, then the economic cost to society for alcohol abuse would be close to $900 million for direct treatment costs in 1980 and $4.9 billion for lost lifetime productivity. Should the estimates of the cost of treatment and mortality due to alcohol abuse-related gastrointestinal tract cancers be added to the already-calculated estimates of alcohol-related costs, the new total would be noticeably, but not overwhelmingly, larger.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table F-1

Numbers and Economic Cost of Premature Mortality Due to Malignant Neoplasms Related to Alcohol Abuse, 1980
($ in millions)

Type	Mortalities			
	Number	Discounted Value (100 percent)	(10 percent)	(56 percent)
Tongue, malignant	1,874	$ 145	$ 15	$ 81
Mouth, floor malignant	509	39	4	22
Mouth, other, malignant	1,399	108	11	61
Pharynx, malignant, oro	1,127	87	9	49
Pharynx, malignant, naso	585	45	5	25
Pharynx, malignant, hypo	634	49	5	28
Pharynx, malignant, unspecified	1,501	116	12	65
Esophagus, malignant	7,985	619	61	347
Stomach, malignant	14,372	1,115	111	624
Rectum, malignant	7,435	577	58	323
Liver, malignant, primary	2,395	186	19	104
Liver, bile duct type[b]	455	35	4	20
Pancreas, malignant	19,640	1,523	152	853
Larynx, malignant	3,412	264	26	148
Total	63,323	4,911	491	2,750

Source: Unpublished mortality statistics from the Vital Statistics files provided by NCHS, present discounted values provided by NCHS.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table F-2

Direct Treatment Costs for Alcohol-Abuse Related Neoplasms
($ in millions)

General Health Facilities	Year 1980	1981	1982
Hospital-based			
Non-Federal community hospitals (excluding psychiatric units)	$548	$588	$671
VA general hospitals and other facilities	24	24	26
Other Federal facilities	19	19	21
Other general health facilities and services			
Nursing homes	92	98	109
Private practice physicians	29	35	32
Other health professionals	19	21	23
Drugs and drug sundries	85	87	89
Other health services	44	46	51
Volunteer services	15	16	17
Total	$874	$934	$1,039

Totals may not add due to rounding.

Source: Research Triangle Institute.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

The $874 million of treatment costs for the selected GI cancers in 1980 is somewhat more than 10 percent of total health treatment costs due to other alcohol abuse related illnesses. These cancers represent a more significant although, again, not overwhelming impact on total mortality costs. The additional 63,000 mortalities attributable to alcohol abuse would almost double the number of deaths attributable to alcohol abuse. At 100 percent discount, however, there would be a $4.9 billion increase in mortality costs, already estimated at $13.9 billion. This would be a 35 percent increase in the mortality costs at the 6 percent discount rate.

The combined increase in treatment cost and mortality cost with a 100 percent attribution would be $5.8 billion. This is 6.7 percent of the total value already attributed to alcohol abuse.

At the other extreme, should only 10 percent of these GI neoplasms be attributable to alcohol abuse, then treatment cost would have been $87 million higher in 1980, and mortality cost would have been $491 million higher. The combined increase would be .7 percent of the cost estimated in this study.

Another interesting comparison is made by taking the 56 percent causal factor currently assigned to malignant primary liver neoplasms. Should the 56 percent rate be appropriate for other GI tract neoplasms, then health treatment costs would be $490 million higher, and mortality costs would be $2.8 billion higher. The total increase would be just under 4 percent of the current estimate for alcohol abuse.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

G. PROTOCOL FOR UPDATING COST ESTIMATES

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SECTION G. PROTOCOL FOR UPDATING COST ESTIMATES

A. Introduction

Having current data about the economic costs of ADM is essential. Because the function of these values indicates the relative impact of the disorders on economic well-being, it is necessary to have relatively current estimates. Only by maintaining current estimates will it be possible to compare the costs of alcohol and drug abuse, and mental illness to updated estimates of the costs of major disease categories produced by NCHS, and new estimates produced for narrowly defined disorders, such as particular infectious diseases.

The cost estimates presented in this volume have been constructed using a methodology that makes it possible to compare the ADM cost estimates with those for other disorders. The concepts and methodology are consistent with those recommended by the Public Health Service (Hodgson and Meiners, 1979) and with the tradition of previous cost of illness studies.

The best way to maintain current estimates of the economic burden of alcohol abuse, drug abuse, and mental illness is to completely reestimate the costs for each year, utilizing the same methodology from year to year, and inserting the most current values from appropriate statistical series. Completely reestimating costs has essentially been the task of the present effort. This is both time consuming and relatively expensive if the sole function is to provide more recent estimates than the last comprehensive study.

A less expensive and less time intensive technique for maintaining current cost estimates is to make year-to-year adjustments in the values based on a small number of factors that have known relationships to the cost estimates. This is both possible and reasonable where there are a relatively small number of factors that could affect the cost estimates significantly. A specific cost estimate will have some imprecision because adjustments will be made for only some of the most important change factors.

In this section, some of the factors that contribute to changes in estimates of the economic costs of ADM are identified, and then a small number of adjustment factors are selected and their application for use in maintaining current cost estimates is specified.

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Finally, the economic costs to society of ADM in 1981, 1982, and 1983 are estimated using the protocol developed in this study.

B. Sources of Changes in the ADM Cost Estimates Over Time

The 1981 RTI study developed formulas for estimating the costs of ADM. The elements of those formulas delineate the variety of factors that are significant in making cost estimates. A short list of these includes:

- o inflation in wages and prices;
- o growth in the population at risk;
- o sociodemographic distribution;
- o change in the prevalence or incidence rate;
- o causal factors; and
- o social responses to ADM.

Changes in any and all of these elements are incorporated when completely new cost estimates are made.

Inflation is the most obvious and inevitable source of change in economic cost estimates. Market prices in our society continually change, sometimes rapidly (at over 10 percent per year) and sometimes more slowly (potentially down to no change, or even a negative change). Moreover, wages and different prices may change at different rates in the same period of time. Health prices increased more rapidly than prices of other consumer goods during the last 20 years. Wages and salaries have grown at a rate faster than consumer prices because productivity of the workforce has improved. Although a single inflation rate may be calculated for the gross national product, different sections of the economy have different rates of inflation. Any methodology proposed to adjust for inflation should allow for differences in rates.

As the total population grows, the number of people potentially affected by ADM also increases. However, some sections of the population may be at higher risk than others. The growth in the total population may not reflect change in the numbers in those subpopulations at risk. For instance, total population grew 3.2 percent between 1977 and 1980, while the labor force increased by nearly 8 percent. Thus, the potential for losses from reduced productivity grew by more during that period than did total population. Conversely, a population at very high risk of motor vehicle crashes--18 to 20 year olds--grew by only 3.7 percent over the 3-year period.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

The sociodemographic characteristics of the population at risk can be another source of variation in cost, although such distributions may not change substantially over short periods of time. For instance, in calculating indirect losses, there are substantial differences between productivity values for older and younger workers, and males and females. Should the age/sex distribution of ADM change, while the total population prevalence rate remains the same, the cost to society would change.

Potentially, the true incidence and/or prevalence rates for ADM disorders could change from one year to the next. Completely apart from population growth, the proportion of the population at risk that experiences problems due to ADM may increase or decrease. The costs would change accordingly, even if there were no change in the population at risk, because a different share is affected.

A further complicating factor is that the causal relationship between ADM and costly consequences may change. Apparent causal relationships might change either because there are new data or analyses. Improved study techniques may simply yield more reliable estimates of causal factors. Additionally, ADM might actually have a change in causal relationship with consequences.

Finally, society's response to ADM may impact on any of these items. Social responses may serve to increase some cost components (where these costs reflect intervention efforts) and reduce other cost components (the result of successful interventions being to reduce certain undesirable impacts of ADM). There are many other ways in which the economic cost to society of ADM might be affected by public interventions. A much debated example of this is the current proposal to make 21 the legal drinking age in all states. Such a change could have immediate cost impacts. The criminal justice system may bear higher costs in enforcing the laws, while there may be lower indirect costs due to reduced alcohol abuse-related trauma.

In updating cost estimates, it is recommended that only two of the six factors be adjusted--wage and price inflation and change in the population at risk.

Prices and population changes can be routinely adjusted because quality data are available on a very timely basis for these continuously changing factors.

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The other four factors--incidence and prevalence rates, causal factors, sociodemographic distributions, and social responses--are less likely to change significantly in a short time period than prices, wages, and population. Incidence and prevalence rates for the ADM disorders are not reestimated on an annual basis. It is recommended that detailed cost computations be made when the data from the periodic studies of alcohol and drug abuse become available. The causal relationships of ADM to their consequences are the subject of much scholarly study. New studies on causal relationships will tend to use different data sets, different time periods, and different analysis techniques. These factors make routine adjustments to causal factors unadvisable to undertake.

The impact of new interventions vis-à-vis the economic cost estimates is seldom well monitored, and it is very difficult to integrate the impact of changing social responses to ADM into the cost estimation framework.

C. A Simplified Cost Update Protocol

A two-factor update protocol is recommended. The first factor is an adjustment for inflation, and the second is an adjustment for population growth or real change.

There are somewhat different sets of factors for the various types of cost components. The basic premise of this methodology is that proportional changes (over a period of time) in the adjustment factors are related to proportional changes in the values of the cost components. The period of time is the time between the base year (year with the most recent estimate for the cost component, referred to as "b.year") and the update year (year for which updated estimates for the cost component are desired, referred to as "u.year").

The general update formula is

$$CC_{u.year} = CC_{b.year} \times (AFI_{u.year} \div AFI_{b.year}) \times (AFRC_{u.year} \div AFRC_{b.year})$$

where

$CC_{u.year}$ = value of cost component (CC) in update year (u.year)

$CC_{b.year}$ = value of cost component (CC) in base year (b.year)

$AFI_{u.year}$ = value of adjustment factor for inflation (AFI) in update year (u.year)

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$AFI_{b.year}$ = value of adjustment factor for inflation (AFI) in base year (b.year)

$AFRC_{u.year}$ = value of adjustment factor for real change (AFRC) in update year (u.year)

$AFRC_{b.year}$ = value of adjustment factor for real change (AFRC) in base year (b.year).

This formula applies proportional change adjustments for inflation ($AFI_{u.year} \div AFI_{b.year}$) and real change ($AFRC_{c.year} \div AFRC_{b.year}$) to the value of the cost component in the base year to produce a value for the update year.

Table G-1 lists the cost components for ADM and specifies an adjustment factor to reflect change in inflation and a factor to reflect real change. The adjustment factors are in each case a data series that is routinely maintained and published by a government agency. Values for these data series are readily available from publications of these agencies (listed in the table) or by personal communication. The complete references for the publications and identification of the responsible agencies are on the bottom of the table.

Separate adjustment factors are specified for the major components of the costs of ADM. Different factors allow the various cost components to change at somewhat different rates, as dictated by the factors "more" appropriate for each component.

For a given cost component, the same factors are suggested for adjusting estimates for each of the three ADM disorders. The two factors for each cost component reflect general influences that are likely to affect costs of the ADM disorders in similar, if not identical, ways. As stated above, there are many other factors likely to be relevant to cost changes; however, incorporating many or all of those changes in updated estimates would require recalculating the costs from the start. This update protocol is only intended to reflect major, relatively unambiguous, changes that occur over a period of several years. Beyond three to four years, the full cost estimates should be performed again, with an assessment made of new findings and data about ADM.

To facilitate implementation of the update protocol, historical values are presented for the recommended adjustment factors (see table G-2). Data

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Table G-1

Adjustment Factors for Updating ADM Economic Costs to Society Estimates

Cost Component	Adjustment Factor	Data Series	Source
Treatment and Support	Inflation & Real Change	Total National Health Expenditures	Health Care Financing Review
Mortality	Inflation	Compensation per hour in the business sector	Monthly Labor Review
	Real Change	Total deaths	
Morbidity-Reduced Productivity and Lost Employment	Inflation	Compensation per hour in the business sector	Monthly Labor Review
	Real Change	U.S. Civilian Labor Force	Monthly Labor Review
Motor Vehicle Crashes -Direct Costs	Inflation	Implicit price deflator for gross national product	Survey of Current Business
	Real Change	Motor vehicle accidents (on the road)	Accident Facts
Crime	Inflation	Implicit price deflators for gross national product: Government purchases of goods and services (state and local)	Survey of Current Business
	Real Change	Crime Index: Number of known offenses	Crime in the United States; Uniform Crime Reports

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Cost Component	Adjustment Factor	Data Series	Source
Social Welfare Programs	Inflation	Implicit priced deflators for gross national product: Government purchases of goods and services (state and local)	Monthly Labor Review
	Real Change	Adult population (18-64 years) (as of July 1, each year)	Current Population Reports, Series P-25
Other Direct Costs	Inflation	Implicit price deflators for gross national product	Survey of Current Business
	Real Change	Adult population (18-64 years) (as of July 1, each year)	Current Population Reports, Series P-25
Victims of Crime	Inflation	Compensation per hour in the business sector	Monthly Labor Review
	Real Change	Crime Index: Number of known offenses	Crime in the United States: Uniform Crime Reports
Crime Careers (Drug Abuse only)	Inflation	Compensation per hour in the business section	Monthly Labor Review
	Real Change	Heroin addicts in the United States	National Institute on Drug Abuse
Incarceration	Inflation	Compensation per hour in the business sector	Monthly Labor Review
	Real Change	Total population in state and federal prisons	National Prisoner Statistics: Bureau of Justice Statistics Bulletin
Motor Vehicle Crashes -Indirect Costs	Inflation	Compensation per hour in the business sector	Monthly Labor Review
	Real Change	Motor vehicle accidents (on the road)	Accident Facts

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Data Sources for Updating Costs

Accident Facts, National Safety Council, Chicago, Ill., annual.

Current Population Reports, Series P-25, Bureau of the Census, U.S. Department of Census.

Federal Bureau of Investigation, Crime in the United States: Uniform Crime Reports, U.S. Department of Justice, annual.

Health Care Financing Review, Health Care Financing Administration, U.S. Department of Health and Human Services, periodical.

Monthly Labor Review, Bureau of Labor Statistics, U.S. Department of Labor, monthly.

National Narcotics Information Consumers Committee Report, Drug Enforcement Administration, U.S. Department of Justice, annual.

National Prisoner Statistics, Bureau of Justice Statistics Bulletin, Bureau of Justice Statistics, U.S. Department of Justice, periodical.

Survey of Current Business, Bureau of Economic Analysis, U.S. Department of Commerce, monthly.

Vital Statistics of the United States, National Center for Health Statistics, U.S. Department of Health and Human Services, annual.

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are reported for 1975 through 1983 (several values are not available from agencies at this time). The historical data will make it easier to acquire the correct values of new factors.

D. An Example of Using the Protocol

The simplified procedure described above has been implemented to estimate values for 1981, 1982, and 1983 based on the detailed 1980 computations. First, a sample computation for a single cost component--Reduced Productivity costs for alcohol abuse -- is worked out.

Recall that the adjustment formula is

$$CC_{u.year} = CC_{b.year} \times (AFI_{u.year} \div AFI_{b.year}) \times (AFRC_{u.year} \div AFRC_{b.year}).$$

The base (1980) value for the Reduced Productivity component was $50,575 million. The adjustment factor for inflation for this component is "compensation per hour in the business sector." The value of this index was 131.2 in 1980, 143.9 in 1981, 155.1 in 1982 and 163.1 in 1983. The adjustment factor for real change for this component is "civilian labor force" in the United States. The value was 106,940,000 in 1980, and the other values are in table G-2.

The update values for 1981-1983 come directly from application of the formula

$$CC_{1981} = \$50,575 \text{ million} \times (143.9 \div 131.2) \times (108,670,000 \div 106,940,000)$$
$$= \$56,367 \text{ million}$$

$$CC_{1982} = \$50,575 \text{ million} \times (155.1 \div 131.2) \times (110,204,000 \div 106,940,000)$$
$$= \$61,612 \text{ million}$$

$$CC_{1983} = \$50,575 \text{ million} \times (163.1 \div 131.2) \times (111,550,000 \div 106,940,000)$$
$$= \$65,582 \text{ million}$$

The updated cost values increased 11.5 percent between 1980 and 1981, 9.3 percent between 1981 and 1982, and 6.4 percent between 1982 and 1983 as a result of both wage inflation and labor force growth in each year. The proportional increase in each factor over one year equals the value of the adjustment factor in the update year divided by the value of the adjustment factor in the prior year minus one. Thus, the increase in wages between 1980 and 1981 was 0.097 = (143.9 ÷ 131.2) - 1 or 9.7 percent.

Similar update computations have been performed for all cost components for 1981, 1982, and 1983 using the base values for 1980 (see table I-1 or

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table G-2

Historical Data Series of Adjustment Factors for Update Protocol

Year	Total National Health Expenditures ($ in billions)	Compensation per Hour in the the Business Sector (index)	Implicit Price Deflator for State & Local Government Purchases of Goods and Services (index)	Implicit Price Deflator for for Gross National Product (index)	Adult Population (18-64 years) (as of July 1) (thousand)	Total Deaths (thousand)	U.S. Civilian Labor Force (thousand)	Crime Index Number of Known Offenses (thousand)	Motor Vehicle Accidents (millions)	Heroin Addicts (thousand)	Population in State and Federal Prisons
1975	$132.7	85.5	129.4	125.8	125,604	1,893	93,775	11,257	16.5	550	N.A.
1976	149.7	92.9	138.3	132.3	128,034	1,909	96,158	11,305	16.8	500	N.A.
1977	169.2	100.0	148.4	140.1	130,407	1,900	99,009	10,936	17.6	495	300,024
1978	189.3	108.6	159.7	150.4	132,820	1,928	102,251	11,141	18.3	470	307,276
1979	215.0	118.7	173.7	163.4	135,329	1,914	104,962	12,153	18.1	420	314,457
1980	249.0	131.2	191.6	178.6	137,842	1,990	106,940	13,295	17.9	492	329,821
1981	286.6	143.9	208.1	195.5	140,054	1,987[a]	108,670	13,290	18.0	492[b]	369,930
1982	$322.4	155.1	222.9	206.9	142,149	1,986[a]	110,204	12,857	18.1	492[b]	414,362
1983	$333.5[c]	163.1	236.6	215.6	144,022	2,010[a]	111,550	(11,960)[d]	N.A.	492[b]	438,830

[a]Preliminary.

[b]1980 is the most recent year for this estimate from NNICC.

[c]This value has been estimated by RTI based on inflation in personal health care prices and growth in total population. The 1983 value will be available in August, 1984.

[d]Preliminary tabulations as of April, 1984 indicated a 7 percent drop between 1982 and 1983. This translates into a Crime Index of about 11,960,000 known offenses.

N.A.: not available.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

III-1), and the available data on adjustment factors. The results appear in tables G-3, G-4, and G-5.

Using this procedure, the economic costs to society of ADM are estimated to increase from $190 billion in 1980 to $213 billion in 1981, $234 billion in 1982, and $249 billion in 1983. The estimates for alcohol abuse, drug abuse, and mental illness do not increase proportionally with the total over the three years of updating because growth in components is different.

The growth in estimated total costs of ADM was greater than the overall rate of inflation in the economy. These estimates indicate growth of 12.1 percent between 1980 and 1981, 9.9 percent between 1981 and 1982, and 6.4 percent between 1982 and 1983. In contrast, inflation as measured by the "implicit price deflator for gross national product" was 9.5 percent, 5.8 percent, and 4.2 percent respectively. The difference between overall inflation and the increase in cost estimated is due to population growth, other real changes, and increased productivity of the work force as reflected by the "compensation" adjustment.

E. A Final Cautionary Note

Updated cost estimates allow the impact of ADM to be roughly assessed in more current dollars and units. The protocol uses the readily made adjustments for the most fundamental changes. While these estimates will be used in place of current cost estimates (or because data for current estimates are unavailable), they are only a substitute for current data. It is recommended that updated values only be used for, at most, three to four years, until it becomes propitious to make completely new estimates due to an accumulation of more recent data, and findings about the incidence, prevalence, and consequences of ADM in our society.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table G-3

Updated Costs to Society of Alcohol Abuse, Drug Abuse, and Mental Illness, 1981
(dollars in millions)

	Alcohol Abuse	Drug Abuse	Mental Illness	Total
Core Costs				
Direct				
Treatment and Support	$12,052	$1,661	$27,115	$ 40,828
Indirect				
Mortality[a]	15,832	2,168	7,881	25,880
Reduced Productivity	56,367	28,661	3,480	88,508
Lost Employment	4,575	348	20,666	25,589
Other Related Costs				
Direct				
Motor Vehicle Crashes	2,405	[c]	-	2,405
Crime	2,548	6,417	945	9,909
Social Welfare Programs	42	2	222	266
Other	3,239	597	733	4,569
Indirect				
Victims of Crime	189	926	-	1,115
Crime Careers	-	9,570	-	9,570
Incarceration	2,216	1,803	108	4,127
Motor Vehicle Crash (time loss)	512	[c]	-	512
Total	$99,976[b]	$52,154[b]	$61,149[b]	$213,279

Totals may not add due to rounding.

[a]At 6 percent discount rate.

[b]The total costs to society for each of the three ADM disorders are not comparable, since the completeness of data available for each cost category varied significantly. For example, the estimate of reduced productivity is relatively complete for alcohol abuse, only partially complete for drug abuse, and incomplete for mental illness.

[c]Although costs are hypothesized to occur in this category, sufficient data are not available to develop a reliable estimate.

Source: Research Triangle Institute.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table G-4

Updated Costs to Society of Alcohol Abuse, Drug Abuse, and Mental Illness, 1982
(dollars in millions)

	Alcohol Abuse	Drug Abuse	Mental Illness	Total
Core Costs				
Direct				
Treatment and Support	$13,558	$1,868	$30,502	$45,928
Indirect				
Mortality[a]	17,055	2,336	8,490	27,881
Reduced Productivity	61,612	31,328	3,803	96,744
Lost Employment	5,001	380	22,589	27,970
Other Related Costs				
Direct				
Motor Vehicle Crashes	2,560	[c]	-	2,560
Crime	2,640	6,649	979	10,268
Social Welfare Programs	46	2	241	289
Other	3,479	642	787	4,908
Indirect				
Victims of Crime	197	966	-	1,163
Crime Careers	-	10,314	-	10,314
Incarceration	2,675	2,177	131	4,983
Motor Vehicle Crash (time loss)	555	[c]	-	555
Total	$109,376[b]	$56,663[b]	$67,522[b]	$233,561

Totals may not add due to rounding.

[a]At 6 percent discount rate.

[b]The total costs to society for each of the three ADM disorders are not comparable, since the completeness of data available for each cost category varied significantly. For example, the estimate of reduced productivity is relatively complete for alcohol abuse, only partially complete for drug abuse, and incomplete for mental illness.

[c]Although costs are phyothesized to occur in this category, sufficient data are not available to develop a reliable estimate.

Source: Research Triangle Institute.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000

Table G-5

Updated Costs to Society of Alcohol Abuse, Drug Abuse, and Mental Illness, 1983
(dollars in millions)

	Alcohol Abuse	Drug Abuse	Mental Illness	Total
Core Costs				
Direct				
Treatment and Support	$ 14,865	$ 2,049	$33,445	$50,359
Indirect				
Mortality[a]	18,151	2,486	9,036	29,673
Reduced Productivity	65,582	33,346	4,048	102,976
Lost Employment	5,323	405	24,044	29,772
Other Related Costs				
Direct				
Motor Vehicle Crashes	2,667	[c]	-	2,667
Crime	2,607	6,565	966	10,139
Social Welfare Programs	49	3	259	311
Other	3,673	677	831	5,181
Indirect				
Victims of Crime	192	945	-	1,137
Crime Careers	0	10,846	-	10,846
Incarceration	2,979	2,425	146	5,549
Motor Vehicle Crash (time loss)	583	[c]	-	583
Total	$116,674[b]	$59,747[b]	$72,775[b]	$249,196

Totals may not add due to rounding.

[a]At 6 percent discount rate.

[b]The total costs to society for each of the three ADM disorders are not comparable, since the completeness of data available for each cost category varied significantly. For example, the estimate of reduced productivity is relatively complete for alcohol abuse, only partially complete for drug abuse, and incomplete for mental illness.

[c]Although costs are hypothesized to occur in this category, sufficient data are not available to develop a reliable estimate.

Source: Research Triangle Institute.

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Source: https://www.industrydocuments.ucsf.edu/docs/nzdl0000